

The Effects of the Combined Use of Merocel and Silicone Nasal Packs on Pain, Bleeding, and Mucociliary Activity After Septoplasty

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Abstract

Objective: Epistaxis is one of the common complications after septoplasty. The type of packs more effective in preventing bleeding after the surgery is still a matter of debate. The aim of this study is to compare the effects of airway Doyle Silicone pack, Merocel pack, and the combination of Merocel and silicone packs on pain, bleeding, and mucociliary clearance after septoplasty.

Material and Methods: This study is a prospective cohort study. A total of 75 patients who underwent septoplasty were divided into 3 groups: silicone pack was applied to the first group (termed group S), Merocel pack was applied to the second group (termed group M), and a combination of Merocel and silicone packs was applied to the third group (termed group M+S). The amount of bleeding, the intensity of pain, and mucociliary clearance duration were compared.

Results: The amount of bleeding in group M+S was significantly lower than that in group S ($p < .001$). The amount of bleeding in group M+S was significantly lower than that in group M ($P = .003$). Pain was significantly lower in group S than in groups M and M+S ($p < .001$ and $p = .024$).

Conclusion: It was determined that combined use of silicone and Merocel packs after septoplasty caused less bleeding than the use of silicone pack or Merocel pack alone. The combined use of Merocel and silicone packs can be a good alternative packing method because it reduces nasal bleeding after septoplasty.

Keywords: Bleeding, mucociliary clearance, nasal septum, pain, surgical tampon

INTRODUCTION

Nasal obstruction is a common complaint in the ear, nose, and throat (ENT) clinics in practice. Nasal septum deviation (NSD) is defined as the displacement of the nasal septum to one side, and it often leads to nasal obstruction (1). The main treatment of NSD is surgical correction with septoplasty (2). Septoplasty is the most common surgical procedure in ENT clinics. Nasal packs are used to provide bleeding control after septoplasty, to prevent adhesions, to provide support, to close the dead space between cartilage and mucoperichondrial flaps, and to prevent septal hematoma (3-5). An ideal pack should cause minimal complaints from patient and should be easily applicable and removed from the patient (5). Today, there are a wide variety of nasal packs. The most commonly used packing materials after the septoplasty are internal silicone nasal splint, Merocel, Vaseline gauze, glove finger packs, siliceous sheets, and gauze strip pack (6, 7). There are several disadvantages of applying nasal packing. The most common of these is the occurrence of nasal obstruction, nasal mucosal injury, bleeding, pain, allergic reactions, dysphagia, dyspnea, mouth instability, and toxic shock syndrome (6, 8). Pain during nasal pack removal is one of the most common complaints of patients (7).

Because of the many undesirable side effects of using packs, clinicians are struggling to develop new packing techniques in different structures and shapes. It has been reported that septal sutures are the only procedures applied without packing (4, 6). There is still no consensus on the ideal pack material and the duration of administration. It is still a question of which nose pack is the most suitable for patient satisfaction and clinical ease of use.

The aim of this study is to compare the effects of using a silicone pack, Merocel pack, and a combination of Merocel and silicone packs on pain, bleeding, and mucociliary clearance after septoplasty.

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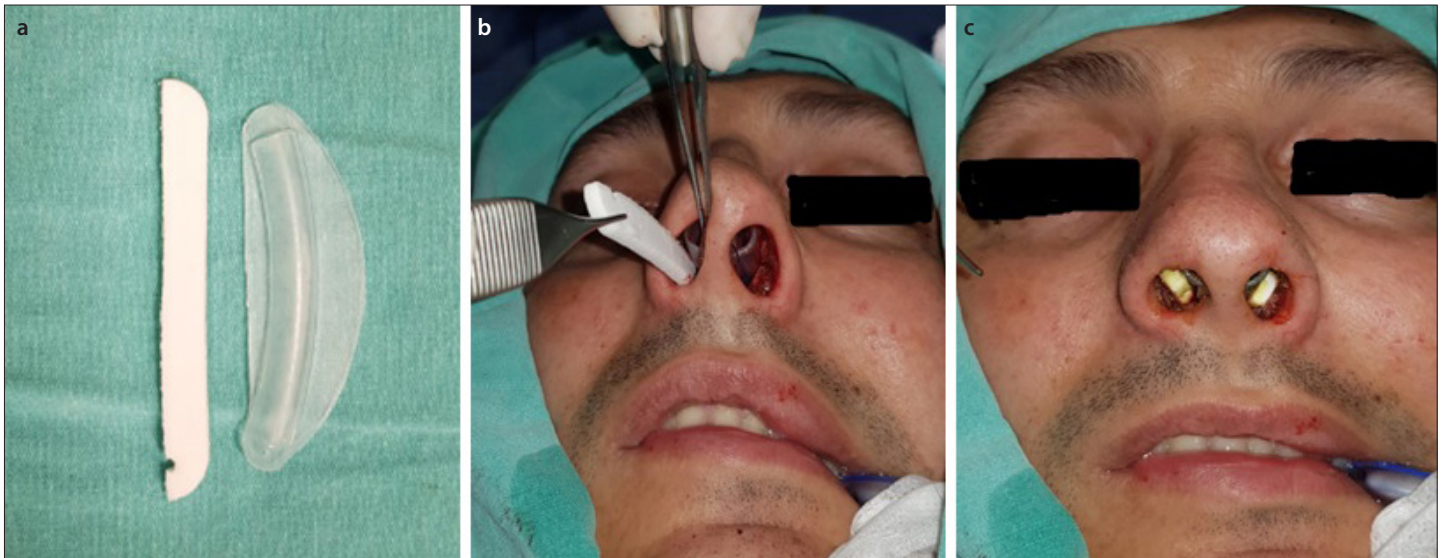


Figure 1. a-c. A Demonstration of the Combined Application of Merocele and Silicone Packs. (a) Long axis parallel cutting of the Merocele pack (b) Placing the Merocele pack between the inferior concha and the silicone pack (c) Fixing of both packs

Material and Methods

This study was conducted between January 2016 and July 2017 in a total of 75 patients who underwent septoplasty in the otolaryngology polyclinic of Hitit University. The ethical approval for the study protocol was obtained from the Ethics Committee of Clinical Studies of Hitit University (number 2016-22). Informed consent was obtained from all individual participants included in the study. Detailed anamnesis of the disease was examined, routine ENT and endoscopic nasal examination were performed, and NSD was diagnosed.

Exclusion criteria included a diagnosis of atherosclerotic heart disease, malignancy, hypertension, hematologic disease, chronic systemic disease, allergy, nasal polyp, diabetes mellitus, aspirin intolerance, granulomatous and vasculitic disease, and isolated inferior concha hypertrophy and history of previous nose surgery. All patients were operated on general anesthesia, and the same surgeon performed a septoplasty with the Cottle technique. At the end of the surgery, the silicone pack was applied to the first group (termed group S), Merocele pack (Merocele 2000; Medtronic Xomed, Heerlen, Netherlands) was applied to the second group (termed group M), and a combination of Merocele and silicone packs was applied to the third group (termed group M+S).

The Merocele pack was then cut in half, parallel to the long axis, and fixed in both nasal cavities by placing it between the inferior concha and the silicone pack (Figure 1). The nasal pack type and method used in all patients were recorded. On postoperative day 3, the nasal packs were withdrawn, and a follow-up form was given. To measure the amount of bleeding, the number of sponges placed on the tip of the nose, which was completely contaminated with blood and changed, was measured. Subjective symptoms, such as the pain score at the time of placing and removing the packs, were evaluated by the visual analog scale (VAS).

In the VAS assessment, patients were asked to grade from 1 to 10, corresponding with ratings from mild to severe. All patients were invited to the outpatient clinic on day 3, day 10, and day 30 after the surgery, and anterior rhinoscopy and endoscopic nasal examinations were performed.

The mucociliary clearance times were measured and recorded by saccharin test immediately before and 3 months after the surgery. For the clearance test, the patients were placed in an upright position after 30 min of rest, and 5 mg saccharin was placed on the anteromedial surface of the inferior concha using alligator forceps to measure the taste sensation in the mouth. Patients were advised not to sneeze during the test, not to bow forward, not to eat anything, not to drink, to keep their mouths open, and to breathe in through the mouth and nose at the same time.

Statistical Analysis

Statistical analyses were performed with the Statistical Package for the Social Sciences (SPSS) version 22.0 (IBM SPSS Corp.; Armonk, NY, USA). Distribution of normality was examined by Kolmogorov-Smirnov and Shapiro-Wilk tests. Descriptive statistics are presented as median (minimum-maximum) and mean \pm standard deviation for continuous variables and as number and percentage for categorical data. Comparisons were made with Kruskal-Wallis test because the amount of bleeding and the pain score were not distributed normally according to the groups. The nonparametric Wilcoxon signed-rank test was used because the data were not normally distributed for mean scores of mucociliary clearance levels before and after comparison. The level of statistical significance was a p value less than 0.05.

RESULTS

There were 24 females (32%) and 51 males (68%) in the study. According to the groups, there were 7 females (28%) and 18 males (72%) in group S, 8 females (32%) and 17 males (68%) in group M, and 9 females (36%) and 16 males (64%) in group M+S. There was no significant difference between the groups with respect to sex ($p=0.832$). The mean age of the patients was 32.7 ± 9.5 years. There was no difference between the groups in terms of age ($p=0.149$). Preoperative and postoperative mucociliary clearance averages were compared according to the patient's groups, and the results are provided in Table 1. There was a significant difference in all groups before and after the surgery ($p=0.003$, $p<0.001$, $p=0.034$, respectively) (Table 1). In addition, the values in each group were subtracted from the values before the surgery, and a new difference variable was created; the groups were compared. There was no significant difference between the groups (Table 1, $p=0.402$).

Table 1. Mucosilier clearance averages before and after surgery across the groups

Group		N	Pre-post comparison			Comparison of differences pre and post		
			Mean±SD	Median (min/max)	p	Mean±SD	Median (min/max)	p
Merocel	pre	25	16.84±7.28	17.1 (5.1/42.0)	0.003*	0.68±0.92	0.85 (-1.2/2.6)	0.402
	post	25	17.52±7.10	17.20(6.8/41.2)				
Merocel +Silicon	pre	25	17.62±6.08	17.1 (9.1/29.0)	<0.001*	1.26±1.25	0.90 (-0.6/5.2)	
	post	25	18.89±6.09	18.0 (10.0/31.0)				
Silicon	pre	25	17.99±6.88	17.4 (8.4/39.0)	0.034*	0.82±3.21	0.86 (-.8/11.7)	
	post	25	18.81±6.24	18.3 (9.0/32.0)				

*Statistically significant (p<0.05)

Table 2. The amount of bleeding (number of sponges) across the groups

	Groups	N	Mean±SD	Median	Min	Max	p	Post-hoc p
When the pad present	Merocel	25	3.28±1.28	3	1	7	<0.001*	1-2 p=0.122
	Merocel+silicon	25	2.56±1.23	2	1	6		1-3 p=0.103
	Silicon	25	4.28±1.62	4	1	8		2-3 p<0.001*
When removing the pad	Merocel	25	2.24±0.88	2	1	4	0.003*	1-2 p=0.003*
	Merocel+silicon	25	1.40±0.71	1	0	3		1-3 p=0.052
	silicon	25	1.64±0.91	1	0	3		2-3 p=1.000

*Statistically significant (p<0.05)

Table 3. Pain scores (Vas Score) across groups

	Groups	N	Mean±SD	Median	Min	Max	p	Post-hoc p
When the pad present	Merocel	25	5.24±1.27	6	2	7	<0.001*	1-2 p=0.007
	Merocel+silicon	25	3.96±1.43	3	1	6		1-3 p<0.001
	Silicon	25	3.36±1.19	3	1	6		2-3 p=0.492
When removing the pad	Merocel	25	4.88±1.48	5	2	8	<0.001*	1-2 0.217
	Merocel+silicon	25	4.04±1.72	4	1	9		1-3 p<0.001
	Silicon	25	2.84±2.01	2	1	9		2-3 p=0.024

*Statistically significant (p<0.05); VAS: visual analog scale.

Between the groups, the amount of bleeding (number of sponges used) was compared by recording when the pack was present and when it was removed. There was a significant difference between the groups when the pack was present (p<.001, Table 2). Posthoc tests were performed to determine the groups in which the difference occurred after performing analysis of variance. According to the test results, there was only a significant difference between group M+S and group S (p<.001). In group S, the median was 4 (4.28±1.62), whereas it was 2 (2.56±1.23) in group M+S, that is, the amount of bleeding in group M+S was significantly lower than that in group S. There was a significant difference between the groups when the pack was removed (p=.003, Table 2). Posthoc test results showed that the significant difference was between group M and group M+S (p=.003). In group M, the median was 2 (2.24±0.88), whereas it was 1 (1.40±0.71) in group M+S, that is, the amount of bleeding in group M+S was significantly lower than that in group M. Distribution of the bleeding amount according to the groups is presented in Figure 2.

VAS score was compared between the groups when the pack was present and when it was removed. There was a significant difference between the groups when the pack was present (p<.001, Table 3).

According to posthoc test results, the significant difference was between group M and group M+S and between group M and group S (p=.007 and p<.001, respectively). It was observed that the pain intensity when the pack was present was significantly lower in group S than in group M and group M+S. There was a significant difference between the groups when the pack was removed (p<.001, Table 3). According to posthoc test results, the significant difference was between group M and group S and between group M+S and group S (p<.001 and p=.024, respectively). In group S, the pain intensity at the time of pack removal was found to be significantly lower than that in group M and group M+S. Pain score distribution according to the groups is presented in Figure 3.

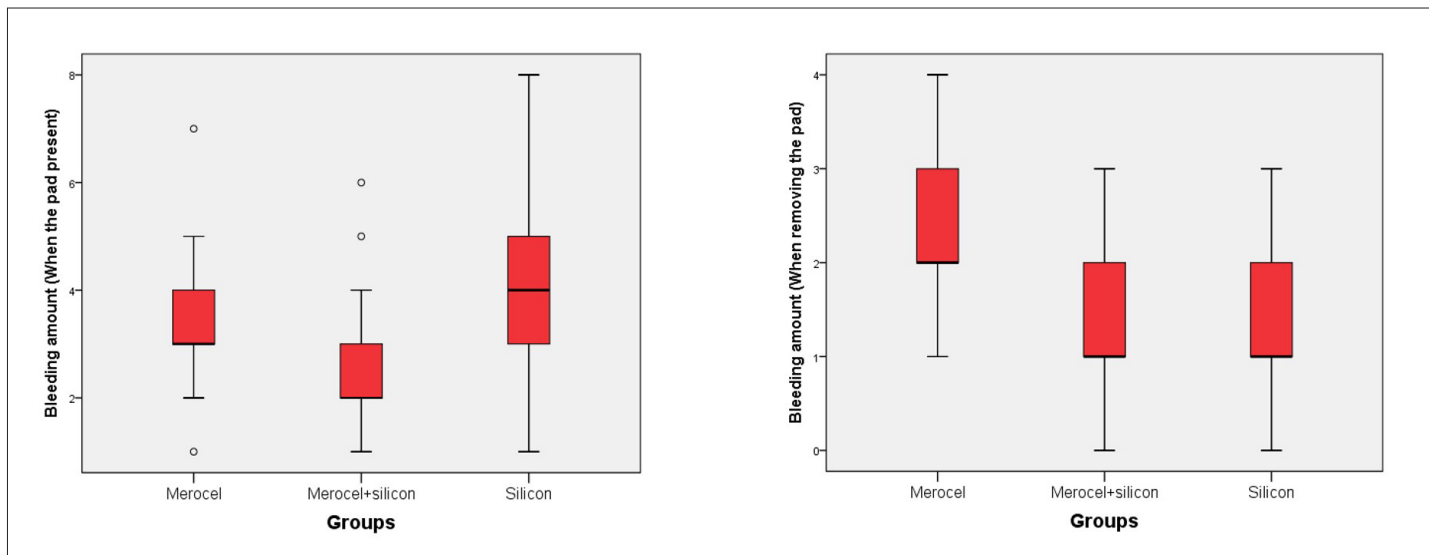


Figure 2. Amount of bleeding across the groups

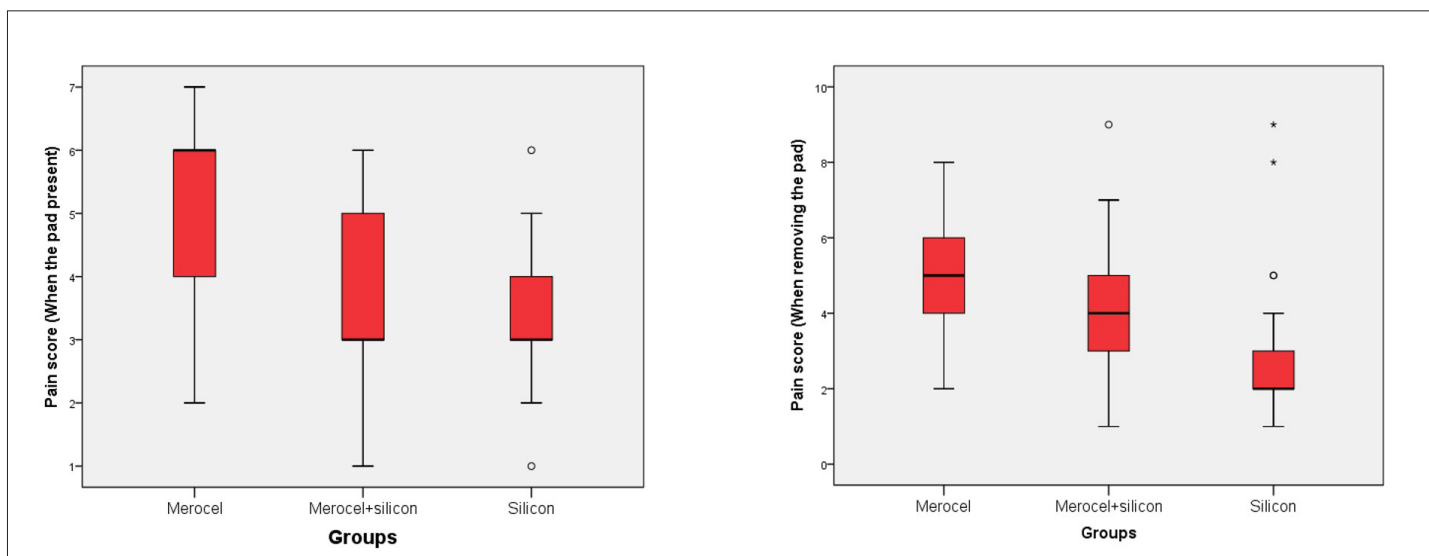


Figure 3. Pain Score distribution across the groups

DISCUSSION

In this study, it was determined that the duration of mucociliary clearance was significantly prolonged after surgery in all the groups. However, this prolongation was not significant when compared between groups. The amount of hemorrhage in group M+S was significantly lower than that in group S when the pack was present, whereas it was observed to be lower than that in group M, although the difference was not significant. The amount of bleeding in group M+S when the pack was removed was significantly lower than that in group M. The amount of bleeding in group M+S was lower than that in group S, but this difference was not significant. It was observed that the intensity of pain when the pack was present was significantly lower in group S than in groups M and M+S. When the pack was removed, the pain intensity in group S was found to be significantly lower than that in groups M and M+S. There was no difference in pain scores between group M+S and group M.

Mucociliary clearance is one of the important defense mechanisms of the nasal respiratory epithelium. The harmful substances contained in the mucus covering are removed from the nasal cavity with the movements of the cilia (9). Normal saccharin clearance time is 7–15 min, and pathological clearance is accepted when the time is >20 min (10). Rhinitis, various pharmacological agents, and nasal allergies affect mucociliary clearance (11). Uslu et al. (12) have shown that NSD decreases mucociliary activity in scintigraphic studies. Ginzel et al. (13) have shown that mucociliary clearance improves after septoplasty. In nasal surgery, the use of a pack has been reported to disrupt sinus drainage and cause prolongation of mucociliary clearance (14).

According to Cukurova et al. (15) a total of 48 patients who underwent septoplasty were divided into two groups: 28 patients were treated with Merocele pack, and 18 patients were treated with transeptal suture technique without any pack. Saccharin test was used in both groups to compare mucociliary clearances 1 and 3 months after the surgery. Mucociliary

clearance was found to be prolonged 1 and 3 months after the surgery in the group that received the Merocele pack compared with that in the group that received transeptal suture (15). In our study, mucociliary clearance after surgery was found to be statistically significant in all the groups. However, this prolongation was not significant when compared between groups. We think that these results are due to the dysfunction of the cilia in the nasal mucosa caused by the nasal packs. The reason for the prolongation of the mucociliary clearance 3 months after septoplasty is because the mucosal cilia cells do not fully heal and do not have sufficient ciliary activity.

In the study by Chevillard et al. (16) a total of 50 patients who underwent inferior turbinectomy were treated with a Merocele nasal pack on one side and a glove finger and hydrocortisone sterilized gas pack on the other side. There was no significant difference between the packs in terms of the discomfort that the patients experienced during the removal of the pack (16). In a study by Bresnihan et al. (17) a total of 21 patients underwent nasal surgery with a series of 5,000 nasal packs on one side and Merocele pack on the other. They found statistically higher pain scores on the side treated with Merocele pack during the withdrawal of the pack (17). In our study, it was seen that the pain intensity in group S was significantly lower than that in group M and group M+S when the pack was removed. There was no difference in pain scores between group M+S and group M.

Garth and Brightwell (18) conducted a study involving 48 patients who underwent septoplasty and were then treated with different nasal packs: Merocele, Telfa, paraffin gas and BIPP (Bismuth iodineparaffin paste). No significant difference was noted between the packs with respect to feeling of discomfort, postoperative pain, bleeding, and ease of use of the pack by the surgeon, which were evaluated when the packs were in place. However, it has been reported that during the removal of the pack, Telfa and paraffin gas cause less irritation and bleeding than Merocele and BIPP (18).

In a study of patients who had undergone septoplasty, Özkırış et al. (19) randomly assigned 98 patients to receive Merocele pack and 99 patients to receive silicone pack. After 48 h, they evaluated the severity of pain during the extraction of the pack with VAS. During the removal of the pack, the silicone pack was found to cause statistically less pain than the Merocele pack (19). In our study, we observed that the severity of pain in group S was significantly lower than that in groups M and M+S while the packs were in place. In group S, the pain intensity at the time of removal of the pack was found to be significantly lower than that in groups M and M+S.

In their study of 64 patients, Kim et al. (20) divided the patients into 2 groups: one group received a nasopore pack, and the other received a Merocele pack. They reported statistically higher pain when removing the pack in the group that received Merocele packs. In addition, in terms of patient comfort, the nasopore pack was statistically more comfortable (20). In our study, we found that the Merocele pack caused a higher pain score.

In a study by Acioglu et al. (5) conducted on 119 patients who had undergone septoplasty, the patients were divided into 4 groups who were randomly applied non airway Merocele pack, silicone pack, Merocele pack, and Vaseline gauze in glove finger. On postoperative day 1, they found that the highest pain score was observed in the group that received a Merocele pack on the glove finger. Merocele pack caused the highest pain potential in the postoperative period and caused the highest bleeding

rate after removal (5). In our study, the highest pain scores were in group M. It was observed that the intensity of pain when there was a pack was significantly lower in group S than in groups M and M+S. When the pack was removed, the pain intensity in group S was found to be significantly lower than that in groups M and M+S. The amount of bleeding when there was a pack was significantly lower in group M+S than in group S. When the pack was removed, the amount of bleeding in group M+S became significantly lower than that in group M.

In the study by Fatih Bingol et al. (21) a total of 60 patients who underwent septoplasty were divided into 2 groups. The first group received a silicone pack, whereas the second group received a Merocele pack. Between the 2 groups, those who received silicone packs reported milder pain and fewer bleeding events when tamponade was performed (21). In our study, we found that the highest amount of bleeding was in group S, although the statistically lowest pain scores were in the same group. The group with the least bleeding events was group M+S. In their study of 60 patients, Wadhera et al. (22) divided the patients into 2 groups. They applied silicone nasal splint to one group and anterior nasal packing method to the other group. At 24 and 48 h after the surgery, pain scores were found to be lower in the group that received silicone nasal splint. Lesser epistaxis, nasal discharge, nasal obstruction, and irritation in the eyes were reported in the group that received silicone nasal splint. (22) In our study, we found that there was less pain in group S, but we found that the highest amount of bleeding was also in group S when the nasal pack was present and when it was removed.

The limitation to our work is the small number of patients in the study groups. In addition, Jang et al. (14) found that the saccharin clearance test was longer on the concave side because there was more loss of cilia on the concave side in the septum. For this reason, we think that it may be more valuable to consider this criterion in the measurement of mucociliary clearance in our study.

CONCLUSION

We found that the use of a combination of Merocele and silicone packs as a new method of nasal packing causes less bleeding when the pack is present and when the pack is removed compared with using any of these packs alone, but we could not find any significant difference between the groups in terms of mucociliary clearance. For this reason, the combined use of Merocele and silicone packs, which were determined to cause less bleeding, may be a good alternative to using a silicone pack or a Merocele pack alone. More comprehensive studies are needed in this area.

Ethics Committee Approval: Ethical committee approval was received from the Ethics Committee of Clinical Studies of Hitit University (No: 2016-22).

Informed Consent: Informed consent was obtained from all participants who participated in this study.

Peer-review: Externally peer-reviewed.

Author Contributions: Concept - A.E., H.D.; Design - A.E., H.D.; Supervision - A.E., H.D.; Resource - A.E.; Materials - A.E., H.D.; Data Collection and/or Processing - A.E., H.D.; Analysis and/or Interpretation - A.E., H.D.; Literature Search - A.E.; Writing - A.E., H.D.; Critical Reviews - A.E., H.D.

Conflict of Interest: The authors have no conflicts of interest to declare.

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